

Abstract

A method for producing a substrate having a carbon-doped titanium oxide layer, which is excellent in durability (high hardness, scratch resistance, wear resistance, chemical resistance, heat resistance) and functions as a visible light responding photocatalyst, is provided. The surface of a substrate, which has at least a surface layer comprising titanium, a titanium alloy, a titanium alloy oxide, or titanium oxide, is heat-treated in a combustion gas atmosphere of a gas consisting essentially of a hydrocarbon, or in a gas atmosphere consisting essentially of a hydrocarbon, such that the surface temperature of the substrate is 900 to 1,500°C; or a combustion flame of a gas consisting essentially of a hydrocarbon, is directly struck against the surface of the substrate for heat treatment such that the surface temperature of the substrate is 900 to 1,500°C, thereby forming a carbon-doped titanium oxide layer, whereby the substrate having the carbon-doped titanium oxide layer is obtained.